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The economic consequences of Mr. Volpi: An analysis of "quota 90"

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ABSTRACT

The revaluation of the lira against the pound, the so-called "quota 90", was a major economic policy decision taken by the fascist government in 1926. The economic history literature has seen this policy as the domestic implementation of the return to the Gold Exchange Standard, which characterized the interwar period, with relatively limited economic consequences. We analyze the effects of "quota 90" through a Vector Error Correction Model and find that the economic cost in terms of output was limited. Granger-causality tests point toward wages reacting to changes in the terms of trade, which is consistent with the historical evidence of wage moderation as a result of labor market reforms that tilted the balance in favor of the firms.

Las consecuencias económicas del Sr. Volpi: un análisis de la "quota 90"

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RESUMEN

La revaluación de la lira italiana frente a la libra esterlina, conocida como "quota 90", fue una importante decisión de política económica tomada por el Gobierno fascista en 1926. La literatura de historia económica ha considerado esta política como la implementación interna de la vuelta al patrón oro, característico del periodo de entreguerras, con consecuencias económicas relativamente limitadas. Analizamos los efectos de la "quota 90" mediante un modelo VECM, encontrando que el coste económico en términos de producción fue limitado. Los test de causalidad de Granger indican que los salarios reaccionaron a los cambios de los términos de intercambio, lo cual es coherente con la evidencia histórica de una moderación salarial como resultado de reformas en el mercado laboral que inclinaron el equilibrio a favor de las empresas.

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1. Introduction

In their classic analysis, Ciocca and Toniolo (1976) identify five sub-periods in the economic policy of fascism: fiscal consolidation (1922-1925), "quota 90"[1] (1926-1929), international crisis (1930-1932), autarchy (1933-1935), empire and preparation for war (1936-1939).

During the first period, excess demand due to investments took inflation to 19% in 1925 and 5% in 1926. The Italian lira depreciated against the sterling from 89.48 in June 1922 to 145 in July 1925 and 154 in July 1926. This contrasted with the appreciation to 90 (the so-called "quota 90"), set out by Mussolini in 1926, obtained through capital controls, increased interest rates, and the compulsory exchange of short-term with long-term bonds.

Looking at the raw data, the revaluation of the lira seems to have caused a slowdown in real GDP in 1926 (+0.8%) and a recession in 1927 (-3% in real terms, -13% in nominal terms), but growth was soon back to 6.3% (1928) and 5% (1929).

As noted by Gabbuti (2020), the economic history of fascism, after intense research in the 1970s, lost momentum, and economic historians turned their interest to liberal Italy. The interpretations given by Toniolo (1980) still represent the received wisdom, and the new wave of data released in 2011 has yet to be used to address the interwar period. "Quota 90" has been analyzed by several authors. However, as de Cecco (1993) noted, on the one hand, it is difficult to assess Mussolini's reasons for implementing "quota 90", and on the other hand, it cannot be dismissed simply as a foolish policy choice. The literature, which we review in the next section, has been mostly interested in the causes of "quota 90", the international relations behind this decision, and the policy change represented by the substitution of Mr. de' Stefani with Mr. Volpi at the helm of the Treasury. Relatively low interest has been devoted to the effects, either on output or the current account. Against this backdrop[2], we try to answer two research questions: What are the effects of the new exchange rate regime on GDP? Was there an adjustment mechanism, as argued in the literature?

This paper attempts to fill this gap in the literature by providing an econometric analysis of the effects of changes in the terms of trade on GDP, and of the price deflation that occurred through wage reduction. In doing so, we first analyze the time-series properties of the variables involved in the study, and we find that a long-run relationship between them exists. Second, through a Vector Error Correction Model, we investigate the short-term adjustment and find that the adjustment to a terms of trade shock is relatively fast. Taken together, these results maintain that the effects of "quota 90" were mild. Third, Granger-causality tests show that changes in terms of trade anticipate changes in wages, supporting the idea that the weakening of the trade unions was a source for regaining competitiveness.

The paper's title is borrowed from Toniolo (1980, p. 121), which in turn refers to "The Economic Consequences of Mr. Churchill", the famous attack on Britain's return to the Gold Standard in 1925 by John Maynard Keynes. Although Mussolini set the objective of revaluating the lira, it was only implemented when Mr. Volpi, who took over from Mr. de Stefani as Minister of Finance, made consequential choices that culminated in adopting this new exchange rate policy.

The paper is organized as follows. Section 2 reviews the implementation of "quota 90" and the literature investigating this policy. In section 3, the methodology and data are introduced, whereas section 4 illustrates the results. Section 5 concludes.

2. "Quota 90" and the economic policy of fascism

"I want to tell you that we are fully determined to carry out our economic fight in defense of the lira, and from this square, I confirm to the whole civilized world that I shall defend the lira to the end"[3]. These few words, pronounced by Benito Mussolini in Pesaro on 18 August 1926, summarize the so-called "Battle for the lira", known as "quota 90"[4], undertaken by the fascist regime between 1925 and 1927.

After the March on Rome, the fascist government aimed to improve state finances by stabilizing and then reducing the public debt. The trade balance, in deficit after World War I, slowly improved, thanks to international circumstances and the devaluation of the lira, which favored exports. Moreover, after two troubled years in 1919-20 with a class struggle both in the industrial and agricultural sectors, wage increases were absorbed. The wholesale price index was stable until the beginning of 1925, and a slight devaluation of the lira hardly affected the cost of living of the middle class and *rentiers*, while entrepreneurial groups benefitted significantly from the situation (Toniolo, 1980). After good harvests, the agrarian sector prospered between 1923 and 1925, although the conditions of agricultural workers hardly improved (id.).

This situation changed dramatically between the end of 1924 and the beginning of 1925 when the lira started to devalue, imports began to outweigh exports, and inflation rose. This new pressure on the balance of payments was caused by the vigor of the German exports that were crowding out those of other countries and the strength of internal demand (id.). Moreover, intense national and foreign speculation hit the Lira hard, contributing to its depreciation (Falco and Storaci, 1977). The exchange rate against the dollar and the pound started to falter, reaching over 27 for the dollar and over 132 for the pound in July 1925 (Figure 1).

Inflation, muted until 1925, shot up, impacting the cost of living, with dire consequences for the middle class, whose support was crucial for the regime. The price of imports, especially food and other raw materials, increased quickly (Staraci and Tattara, 2001). Consequently, the industrial sectors (such as iron and steel) which depended on imports, were harmed. Vice versa, agriculture and textiles, leading exports, benefited from the shock. Faced with the crisis, the Minister of Finance, Alberto de' Stefani lost the support of both the Fascist Party and the financial world (de' Stefani, 1988; Toniolo and Salsano, 2011, pp. 17-20). Mussolini replaced him with Giuseppe Volpi in July 1925. The choice of Volpi[5], an entrepreneur and finan-

[1] Literally, mark 90, that is 90 lira per one British pound.

[2] See Ricciuti (2014) for a short review of the cliometrics of fascism and for the effects of the economic policies of fascism on capital accumulation.

[3] Translation by Fratianni and Spinelli (1997).

[4] As noted by Sarti (1970), the term "quota 90" was used for the first time by Mussolini on 26 May 1927 in the famous "Ascension Speech". See De Felice (1966) for a political analysis of "quota 90" in the documents of Mussolini and Volpi.

[5] For a recent account on Volpi see Segreto (2019).

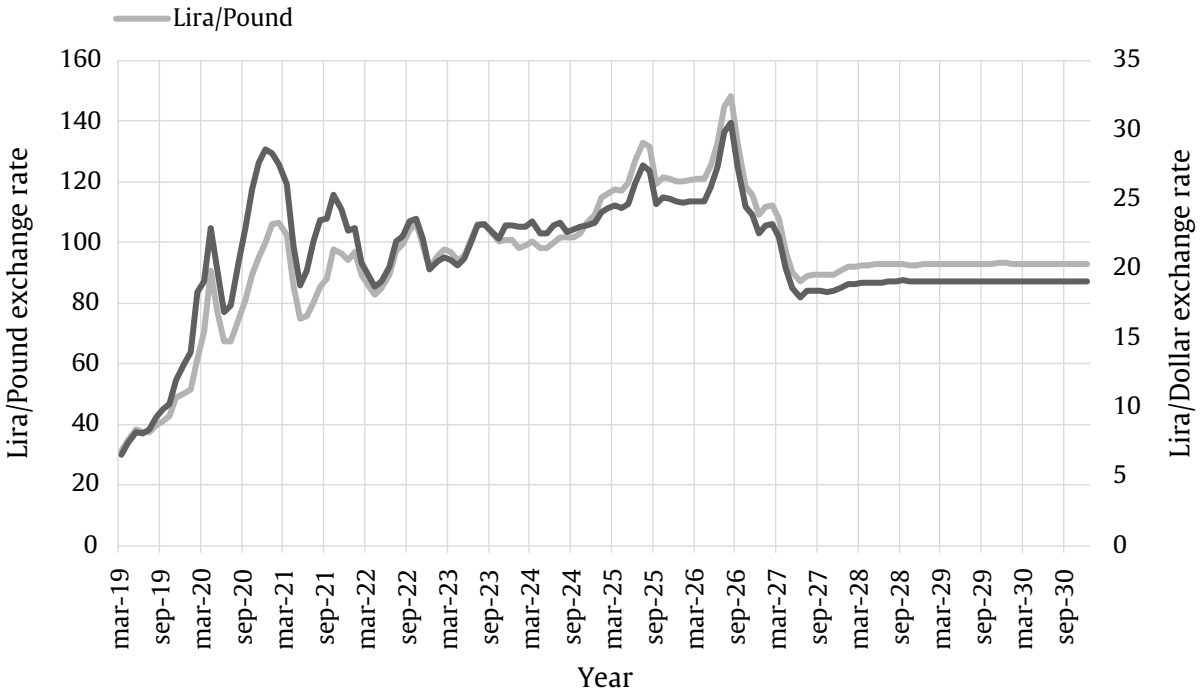

Figure 1. The exchange rate between the lira and the dollar and pound (1919-1929).
Source: Cotula and Spaventa (1993). Data in lira.

cier with an extensive network of relations in the Anglo-Saxon world, can be read as an act of goodwill to manufacturers (Toniolo and Salsano, 2011, p. 20).

With Mussolini's support, the new minister acted differently. The control of monetary circulation became a major issue, and Volpi assumed the surveillance of the exchange market and was in charge of the open-market operations in the same market, which previously belonged to the Bank of Italy (Toniolo, 1980, pp. 102-103). The State started to buy lira in the market to reduce liquidity but not much could be achieved without favorable circumstances internationally. Until April 1926, the lira remained stable, and then a meltdown occurred. Toniolo (ibid.) cites some possible causes: the international situation, increasing inflation, the balance of payments deficit, and the growth of currency supply from big investment banks to companies. Moreover, the American *Quota Act* limited immigration in the US after 1921 and began to bite, drastically decreasing the value of remittances. During the summer, Volpi started some structural interventions to stabilize the value of the currency. In August 1926, the Bank of Italy became the only institution with the right to print money, revoking the rights of the Bank of Sicily and the Bank of Naples. This measure was a message to the American financial world that wanted a modern central bank to deal with (Migone, 1973). Volpi also introduced capital controls in the exchange market to limit speculation, and banks are strongly constrained in dealing with foreign currency (Baffi, 1973). In the London Accords in 1926, Italy had an 84% "haircut" of its debt with the US and the UK (Astore and Fratianni, 2019), mostly related to World War I[6].

During the summer of 1926, Mussolini pronounced the previously mentioned Pesaro Speech, which acted as the prelude to Volpi's action. He completed the previous steps by trying to increase the reserves of hard currencies. A $100 million loan in the US market was arranged by a bank syndicate led by Morgan Bank, and the proceeds were transferred from the Treasury to the Bank of Italy. The *Istituto di credito per le imprese di pubblica utilità*[7] and other private companies placed bonds in the US and handed the dollars to the Bank of Italy, which in turn insured them against exchange rate volatility (Baffi, 1973). At the same time, the government tried to further reduce the currency in circulation by consolidating the public debt. Mussolini and Volpi launched the so-called *Prestito del Littorio* in November 1926: all public debt securities with a maturity lower than seven years were forcibly converted into long-term securities, and further money was raised. In May 1927, a pound was worth 90 lira and the exchange rate had stabilized[8]. With Royal Decree 2325 dated 21 December 1927, the currency reform was completed by joining the Gold Exchange Standard: the pound exchange rate was fixed at 92,46 lira, and the Bank of Italy was obliged to keep a gold reserve or convertible currency equal to 40% of all notes in circulation (Fratianni and Spinelli, 1997).

Historians and economists have long discussed the causes and results of "quota 90". The devaluation of the lira in the previous period was not viewed as a problem by the govern-

[6] After the Lausanne Conference of 1932 which failed to forgive war debt, in 1934 Italy defaulted on its debt (Astore and Fratianni, 2019).

[7] The Institute was a government organization established in Rome in 1924 to grant public and private companies loans secured by mortgages for the execution of works of public interest.

[8] According to Di Nino et al. (2013), the lira real exchange rate corrected for productivity differentials appreciated from 1921 to the mid-1930s, leading to overvaluation. Much of the appreciation was due to "quota 90".

ment, especially by de' Stefani, a free-market economist. This attitude could be called *benign neglect* (Toniolo and Salsano, 2011). However, the government probably had few tools to fight against devaluation and its international causes (Cotula and Spaventa, 1993; Cavalcanti, 2011). Moreover, until the end of 1924, a large portion of the industrial sector supported devaluation until it became costly, particularly for importers as heavy industries. A weak currency suited the textile and agricultural sectors and big exporters, but negatively impacted the middle class, the backbone of the fascist regime (Toniolo, 1980).

Before delving into the discussion about "quota 90", it is worth shedding light on another economic intervention initiated by the government in 1926: the banking reform, which preceded the much more celebrated reform of 1936 that abolished mixed banks. Until this time, there was no specific regulation governing non-issuing commercial banks, nor was there a supervisory mechanism in place. The only exceptions were savings and pawn banks, which were under the oversight of the Ministry of Agriculture, Industry, and Commerce.

Given the regime's primary objective to return to the Gold Standard convertibility, reforming the Central Bank became pivotal in the agenda, since bolstering depositor confidence in the banking system was seen as a prerequisite for monetary stabilization by Mussolini himself (Molteni and Pellegrino, 2022; Cotula and Spaventa, 1993). This initiative culminated in the enactment of the Royal Decree Laws 1511 and 1830 in 1926. These decrees established the Bank of Italy as the primary supervisory entity, requiring new banks, branch openings, mergers, and acquisitions to be authorized by the Ministry, based on the central bank's recommendations. Furthermore, the Ministry of Finance established a public register of all credit institutions *(Albo delle aziende di credito)*.

Molteni and Pellegrino (2022) maintain that supervision increased capital accumulation and reduced lending concentration, also improving capital-to-deposit ratio, minimum capital levels, and loss coverage. Nevertheless, Molteni (2021) documents some closures of distressed banks in the late 1920s, before the Great Depression, which are likely related to the debt deflation (Fisher, 1933) caused by "quota 90", which raised the real value of debt because of deflation, causing people to default on their consumer loans and mortgages[9].

"Quota 90" can be understood within a trend characterizing the major economies after World War I: a tendency to return to the old monetary system[10]. In the aftermath of World War I, all countries abandoned the Gold Standard because of the need to fund the war. Once the war ended, there was a consensus for a rapid return to the pre-war gold standard. In two international conferences (Brussels 1920 and Genova 1922), European countries sought to re-establish gold as the monetary anchor (Bordo and MacDonald, 2003). The resulting monetary framework was called the Gold Exchange Standard. According to the rules, each central bank limited fluctuations in the purchasing power of gold while ensuring continuous cooperation with one another. There were several benefits expected from the return to the gold standard: minimal exchange rate fluctuations, a balanced public budget, and no inflation to fund the public sector[11]. Facing this international environment, "quota 90" was essentially a political decision (Sarti, 1970). Mussolini sought international prestige, and 90 lira per pound was the exchange rate in December 1922, just two months after the March on Rome (De Felice, 1968). So, in Mussolini's opinion, "quota 90" was a symbol of success, preferable to "quota 120", the exchange rate requested by the industrial world via Confindustria and Assonime (Toniolo and Salsano, 2011)[12].

When Italy returned to the Gold Exchange Standard, its exchange rate declined significantly from the prewar parity (the new parity was about 27.3% of the prewar parity (Fratianni and Spinelli, 1997), which was similar to France (Sant Marc, 1983). The devaluation with respect to the prewar parity was not as severe as for other countries (like Germany, see Sommariva and Tullio, 1987) that devalued their currencies to less than 10% of the prewar value. Consequently, "quota 90" is both a significant devaluation of the prewar parity and a revaluation from an international perspective[13].

Another possible cause of revaluation was Mussolini's view of foreign exchange policy as laying the foundations for the Corporative State (Toniolo, 1980). The roots of the Fascist Party included some elements of anticapitalism, and "quota 90" was seen as a way to punish private companies that were only formally supportive of the government. Moreover, it was also a hit on industrial development and urbanization and a decline in fertility, which fascism saw closely intertwined (Baffi, 1973)[14]. Two economists located at very distant points in the political spectrum, Piero Sraffa and Gino Borgatta, saw "quota 90" as a choice of the regime between different social groups. Sraffa claimed that only the middle class and some areas of the working class could benefit from the revaluation, therefore this policy was aimed at obtaining their support (Sraffa and Tasca, 1927). Borgatta (1937) maintained that, since the beginning, the regime acted in contrast with groups with variable incomes that were used to consider money, the exchange rate, and the credit as variables dependent on their needs, and that used devaluation and inflation as a remedy for their mistakes. However, for Sraffa, the cost for the entrepreneurial class was only in the short run (although in the range of "a few billion lira") since it would benefit from a State that strengthened its social support.

[9] On the banking crises in the late 1920s, see Toniolo (1993) and Cafaro (2001).

[10] Indeed, Bonelli *et al.* (1976) strongly maintain that many of the policies implemented by Mussolini were indistinguishable from those of neighboring, democratic countries.

[11] It is interesting to note that until the 2000s the consensus was that adhering to the gold standard was an effective way gain credibility in the financial markets (i.e., Bordo and Rockoff, 1996). However, a new generation of studies (i.e., Flandreau and Zumer, 2004) claimed that the working of the system was non co-operative and prone to shocks that causes several interventions also within the core countries. For a recent review, see Di Martino (2021).

[12] In a note to Volpi dated 26 april 1927, Mussolini claimed that the revaluation took place only with respect to the devaluation occurred after the fascist regime took power, therefore it was merely a reinstaitment of the previous external value of the lira (De Felice, 1968).

[13] We thank a reviewer for pointing this out.

[14] This point was also in the Ascension Speech, where Mussolini claimed that he envisioned a development based on "healthy industries" such as agriculture and phishing. This would have prevented the expansion of an industrial proletariat that could be an enemy of the regime (Baffi, 1973: 114-115).

Indeed, "quota 90" represented a low point in the relationship between fascism and industrial interests. Melograni (1980) reported a meeting in November 1926 at the Industrial Federation of Milan where export-oriented industries (textiles, food products, etc.) feared a policy of deflation, since it would make their products less competitive on the international market, while the metalworking and chemical industries were also concerned that a strong lira would make foreign industrial goods more competitive on the Italian market. Finally, electricity companies feared that the debts contracted during the years of high inflation would become more onerous.

Moreover, according to La Francesca (1972), "quota 90" was a policy that brought together Italian economic forces and public opinion in a battle for national pride, which was in tune with the rhetoric of the regime that claimed to unify the different – and conflicting – social groups. Finally, in 1925/1926, although the regime was stable, Mussolini feared that a failure in monetary policy would strengthen his opponents, both inside and outside the country, and be used as a weapon to undermine the fascist regime (Cohen, 1972).

Assessing the results of "quota 90" is more complicated. The currency reform was completed just two years before the onset of the Great Depression, so it is difficult to disentangle the impact of the policy from the crisis. The most evident consequence was the increase, after 1928, in the balance of payments deficit, as acknowledged by scholars at the time (Borgatta, 1937). Cohen (1972) maintains that if the revaluation of the lira had been 10% instead of the 19% sought by "quota 90", the balance of trade in 1928 would have been negative for 188 million lira instead of 2,513 million. Similarly, a revaluation of 120 lira to the pound, would have brought lower unemployment (Cohen, 1988).

In the wake of the 1929 crisis, Italy stood as one of the few nations staunchly defending the Gold Standard system. Mussolini took the reins of economic policy, imposing his decisions on various Finance Ministers —a role that saw four different incumbents within eight years (Volpi was substituted in 1928 by Antonio Mosconi, then the guide was taken by Guido Jung and finally by Paolo Thaon di Revel). However, the shifting international economic landscape, characterized by the decline of free-trade in favor of protectionism, coupled with persistent internal issues like the escalating public deficit, posed significant challenges during the 1930s.

Despite the efforts to maintain the "quota 90" policy, it was eventually abandoned in 1936, as per the Royal Decree 1745 of October 5th, 1936, resulting in a 40.9% devaluation of the Lira. This decision came after Mussolini acknowledged the suggestions from Felice Guarneri, the Superintendent of Currency Exchange, and Finance Minister Thaon di Revel. They pointed out that due to the devaluation of currencies by almost all Western countries, the actual ratio between the Lira and the Pound had already reduced to about "quota 63" instead of the intended "quota 90". Consequently, Mussolini agreed to adjust the value of the Lira to 0.04677 gold grams, returning the exchange rate to about "quota 93"[15].

After the currency reform, unemployment indeed grew, returning to the 1923 level. Deflation and revaluation favored the larger industrial companies over the small and heavy industries over the light, negatively impacting the textile and agricultural sectors particularly (Cohen, 1988). Gualerni (1994) maintains that the revaluation allowed the completion of the country's industrial structure and enabled the industry to adapt to the new world of durable consumer goods. This view was opposed by De Cecco (1990), who argued that the level of income in Italy was too low and therefore imposed a premature phase of development.

The literature has discussed the intimate link between the revaluation of the lira and the internal devaluation that was implemented through wage compression (Sabbatucci Severini and Trento, 1975). "Quota 90" was preceded by changes in the labor market. In October 1925, the Palazzo Vidoni Agreement made non-fascist trade unions illegal and restricted collective bargaining between *Confindustria* (the association of private industrial companies) and the *Confederazione nazionale delle corporazioni sindacali* (the fascist trade union). Subsequently, in April 1927, the *Carta del lavoro* (Charter of Labor) provided the ideological foundation for corporativism and wage cuts (Toniolo, 1980: 114). In the cotton industry, the ninth working hour was first unpaid, then after protesting for the excessive revaluation of the lira (which was quoted at only 109.25) to cut wages in December 1926 (Toniolo, 1980). In May 1927, a 10% cut in agricultural wages in the area of Brescia, initiated similar cuts all over the country. This first round of cuts affected more than 2 million workers in manufacturing and 500,000 in agriculture. In October, the fascist party promoted a generalized wage cut of 10-20% (Toniolo, 1980)[16]. The deflationary policy was in full swing.

Table 1.
Industrial wages in Italy, 1920-1932

Year	Daily real wage (in 1938 lira)	Yearly change (%)
1920	16.69	+10.23
1921	17.34	+3.89
1922	16.45	-5.14
1923	17.12	+4.07
1924	17.02	-0.59
1925	16.25	-4.53
1926	15.84	-2.53
1927	16.08	+1.51
1928	14.93	-7.16
1929	14.72	-1.41
1930	14.62	-0.68
1931	14.74	+0.82
1932	14.80	+0.40

Source: Zamagni (1975).

[15] This move was preceded by the Regio Decreto Legge 1293 of July 21st, 1935, which suspended the mandatory 40% reserve coverage by the Bank of Italy, a fundamental aspect of the "quota 90" reform.

[16] Sylos Labini (1965, p. 33) described the biased wage bargaining process under corporatism.

Table 1 shows the daily real wage for industrial workers (Zamagni, 1975). After two years of sizable increases following World War I, since 1922 real wages had been going down. After the decision to reevaluate the lira and the wage cuts described above, the effect was felt in 1928, with a drop in real wages of about 7%. In 1930, there was a further 8% cut in nominal wages, but the effect on real wages did not materialize.

Del Vecchio (1932) observed that the government acted on rents, retail prices, public servant wages, and some taxes to make the internal prices compatible with the increased value of the lira. De' Stefani noted that a 43% fall in wholesale prices forced a reduction in nominal wages led by the government, his trade unions and the judiciary (Baffi, 1973, p. 112). Mussolini himself had a clear understanding of the issue since, on 26 April 1927, he wrote, "To hit prices and wages, we need that the revaluation to reach a dramatic level… The revaluation has already reduced price stickiness... The reduction of all the goods will accelerate the decline in retail prices." A few days later (2 May), after a weakness of the lira in the exchange rate market, he wrote Volpi, "It may be appropriate to buy a few lira, otherwise there will be a reason to increase the price of food and therefore it will be impossible to lower the wages of government workers" (Baffi, 1973: 112-113, our translation).

3. Methodology and data

This section addresses the empirical relationship between the lira exchange rate and GDP at market prices, to understand the effects of lira revaluation in 1926 on the Italian economy. Terms of trade (ToT) are used to measure the exchange rate. They are the relative price of exports in terms of imports and are defined as the ratio of export prices to import prices. An improvement in terms of trade benefits a country because it can buy more imports for any given level of exports. The terms of trade are influenced by the exchange rate because –the key policy variable here— a rise in the value of a country's currency lowers the domestic prices of its imports but may not directly affect the prices of the commodities it exports.

The first step in this time series analysis involves checking for the stationarity or non-stationarity of the variables; a stationary process is referred to as being integrated of order 0 or I(0), while a nonstationary stochastic process that can be made stationary by taking the first difference is said to be integrated of order I(1).

To test for the presence of a unit root, we apply the Augmented Dickey-Fuller test (1979), which tests for the null hypothesis that a series does contain a unit root against the stationarity of the process and the KPPS test (Kwiatkowski *et al.*, 1992), where stationarity is the null hypothesis and the unit root is the alternative.

Afterwards, a cointegration test is carried out to investigate the long-run relationship between the exchange rate and the economic variables (Johansen, 1988). According to Engle and Granger (1987), even where some economic series are not stationary, some linear combinations of the variables may be stationary. When variables have a common stochastic trend and possess a linear combination that is I(0), they are cointegrated.

Where the variables prove to be cointegrated, the best candidate for modelling the data-generating process is the vector error correction model (VECM) that corrects for short-run disequilibrium. The VECM has in the Dickey-Fuller representation (Lütkepohl and Kratzig, 2004):

$$\Delta y_t = \prod y_{t-1} + \Gamma_1 \Delta y_{t-1} + \ldots + \Gamma_{p-1} \Delta y_{t-p+1} + u_t \qquad (1)$$

The data for GDP at market prices for the period between 1911 and 1939 are taken from Baffigi (2013) and expressed in real terms with base 1911. The data for the terms of trade (ToT) are taken from Federico *et al.* (2011, tab. 8, p. 230). Both variables are in logs. Figures 2 and 3 plot the two variables of interest. Given the small sample size, we estimated the most parsimonious model and acknowledge that it would have been interesting to include other variables that could act as channels

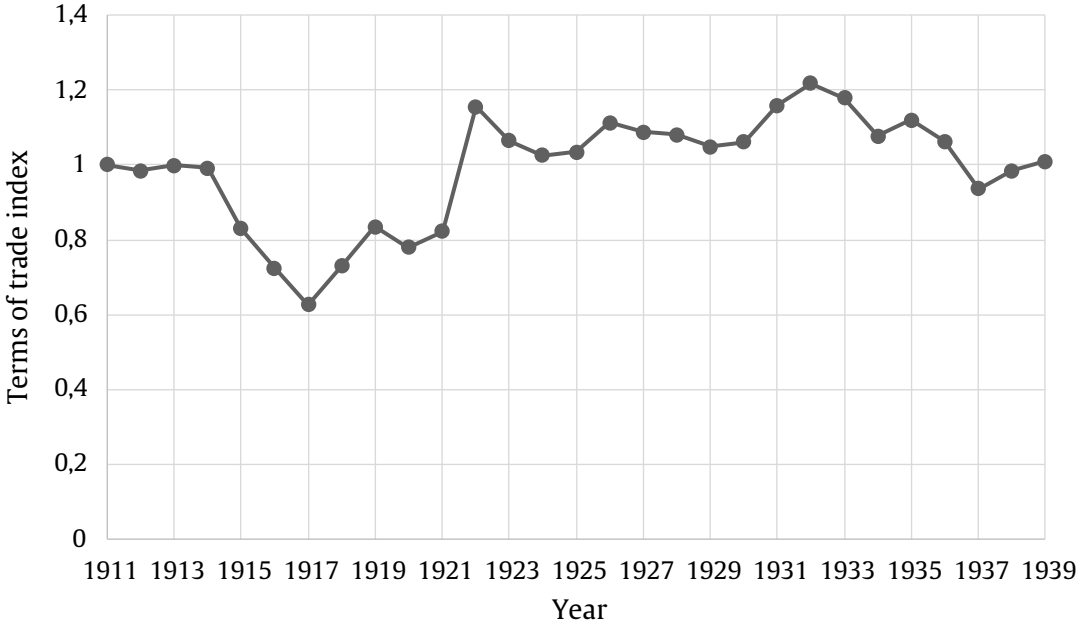

Figure 2. Terms of trade, 1911-1939.
Source: Federico *et al.* (2011)

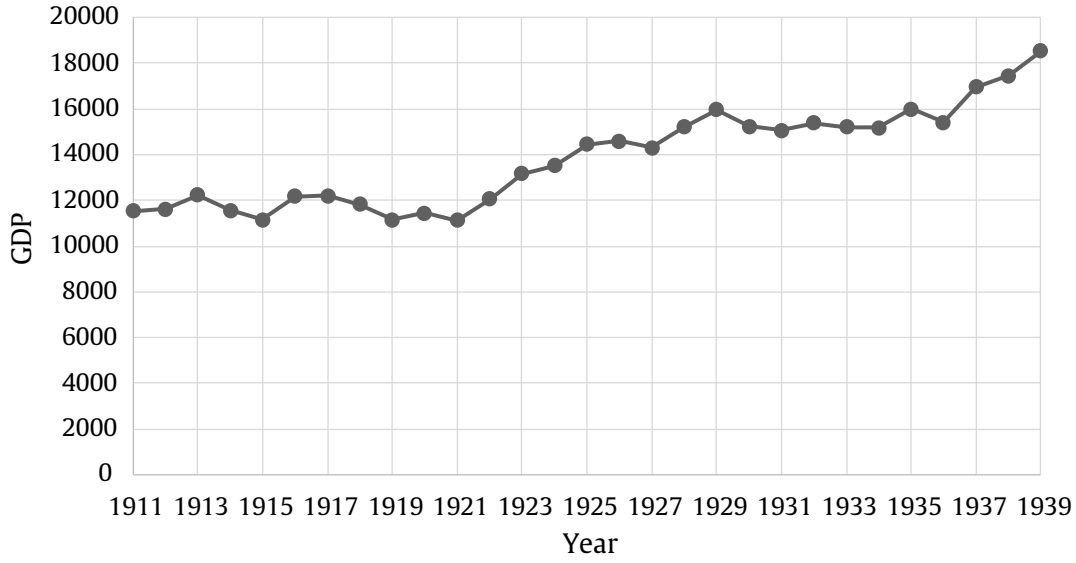

Figure 3. Real Italian GDP, 1911-1939.
Source: Baffigi (2013).

in the relationship between terms of trade and GDP, but this would cause a severe cost in terms of degrees of freedom.[17]

4. Results

We start by analyzing the stochastic properties of the series[18]. Table 2 sets out the results of the unit root tests. For the terms of trade, the ADF cannot reject the null of a unit root in levels, but in first-differences at the 5% significance level, therefore the variable is I(1). This result is confirmed by the KPSS test, where stationarity is rejected in levels at the 10% significance level. The same occurs for GDP, however, the case for unit roots is stronger, since it is obtained at the highest significance level.

Table 2.
Unit root tests

	ADF		KPSS	
	Level	First-differences	Level	First-differences
ln ToT	-1.3919	-3.0095	0.3649	0.3133
ln GDP	-0.1274	-5.0581	1.3973	0.1999

Critical values for the ADF test: -3.43 (1%), -2.86 (5%), and -2.57 (10%). Critical values for the KPSS test: 0.347 (10%), 0.463 (5%), and 0.739 (1%). For ToT the number of lags in level and first-differences in the ADF test is 4 and 2, respectively. For the KPSS, the number of lags is 2 in both cases. For GDP, the number of lags in the ADF test is 8 and 3, respectively, and in the KPSS is 4 and 3. The number of lags was selected through the Akaike Information Criterion.

Having established the nature of the DGP of these variables, we look for the existence of a long-run relationship between them, i.e., cointegration. The trace test by Johansen (1988) was applied. We strongly reject the null hypothesis that $r = 0$, whereas we cannot reject the null of one cointegrating vector (Table 3). Therefore, terms of trade and GDP have common long-run behavior.

Table 3.
Cointegration test

r	Test statistics	90%	95%	99%
0	144.63	23.32	25.73	30.67
1	8.34	10.68	12.45	16.22

To analyze short-run behaviour, we estimate a VECM. The number of lags is determined by the Akaike Information Criterion (6)[19]. Two dummy variables are included: the first to account for World War I (taking the value of 1 from 1915 to 1918 and 0 otherwise), the second to take into consideration the effects of the Great Depression (equal to 1 from 1930 to 1939 and 0 otherwise)[20]. Both may be severe and somehow

[17] Nickelsburg (1985) provides a simulation study on a bivariate VAR with sample sizes of 25, 50, and 100 observations. In selecting the lag structure there is a tendency to underfit the model. The problem is bigger for the lowest number of observations, but only marginally. Underfitting leads to problems of misspecification error, which is troublesome when using a VAR to test for alternative economic theories. In this work, we limit ourselves to the description of the reaction to the economic shocks, without inferring anything beyond our problem at hand.

[18] The econometric analysis was carried out with JMulti and Gretl softwares.

[19] The Hannan-Quinn and the Schwarz information criteriums return the same lag structure. The Bayes information criterion gives an optimal lag of 5. The results are quite similar to those presented here.

[20] The crisis started in October 1929, therefore that year was relatively unaffected. From a technical point of view, the crisis ended in 1933, but its effects in terms of disruption in international trade lasted until 1939. In

exogenous confounders that negatively affected both world demand and GDP (and its composition, since during a war there is a mobilization of resources towards specific industries) with consequences on the current account that are different from those derived from the revaluation of the lira.

We can rewrite eq. (1) as a VECM with factorization:

$$\prod = (-0.240\ -0.262)^{*}\begin{pmatrix} 1 \\ 0.986 \end{pmatrix}' \qquad (2)$$

where the first factor (α) is the error-correction term, reporting the short-run effects of deviations from the long-run equilibrium, and the second factor (β) is the cointegrating term, reporting the long-run effects. The adjustment vectors are -0.240 for ToT and -0.262 for GDP. Both error correction terms are negative, but in the system VECM only the one for ToT is significant (s.e. 0.037, while for GDP is 0.352), showing the existence of a short-term adjustment running from terms of trade to GDP. In economic terms, about a quarter of the disequilibrium error is corrected in one year. The cointegration vector shows an almost one-to-one relationship between the two variables.

We perform two robustness checks. First, we use a shorter definition of the dummy variable for the Great Depression equal to 1 from 1930 to 1933 and 0 in the other years. The VECM factorization is:

$$\prod = (-0.213\ -0.228)^{*}\begin{pmatrix} 1 \\ 0.982 \end{pmatrix}' \qquad (3)$$

Although the absorption of the shock seems to take longer in this specification, the results are qualitatively similar to the baseline.

Second, to consider the turmoil related to the "biennio rosso" (red biennium)[21], we also included a dummy variable equal to 1 in 1919 and 1920 and 0 in the remaining years to the first specification. In this case, the VECM with factorization becomes:

$$\prod = (-0.246\ -0.253)^{*}\begin{pmatrix} 1 \\ 0.981 \end{pmatrix}' \qquad (4)$$

which is very close to the baseline. Provided that the results are quantitatively and qualitatively similar, we consider the baseline our favorite model since it is the most parsimonious specification.

We provide a further robustness check in which we use the real exchange rate (RER) instead of the terms of trade. The real exchange rate is computed as the nominal exchange rate (taken from Cotula and Spaventa, 1993) divided by the ratio of the domestic (from Spinelli and Fratianni (1991) to the Britain consumer price index, which is taken from Capie and Webber (1985). For the variable RER, the ADF and KPSS tests point toward the existence of a unit root in levels and stationarity in first-differences (Table 4 – Panel A). In panel B we find evidence consistent with the existence of one cointegrating vector.

Table 4.

Unit root tests and cointegration test

Panel A - Unit root tests				
	ADF		KPSS	
	Level	First-differences	Level	First-differences
RER	-2.073	-4.524	0.511	0.092

Panel B – Cointegration				
r	Test statistics	90%	95%	99%
0	87.22	23.32	25.73	30.67
1	7.87	10.68	12.45	16.22

Critical values for the ADF test: -3.43 (1%), -2.86 (5%), and -2.57 (10%). Critical values for the KPSS test: 0.347 (10%), 0.463 (5%), and 0.739 (1%). For wage, the number of lags in level and first-differences in both the ADF test and the KPSS test is 2. The number of lags was selected through the Akaike Information Criterion.

In this case, the VECM with factorization becomes:

$$\prod = (-0.364\ -0.486)^{*}\begin{pmatrix} 1 \\ 0.878 \end{pmatrix}' \qquad (5)$$

Which is also consistent with the baseline model.

Interpreting these results for the problem at hand, we can maintain that the revaluation of the lira had relatively mild consequences on output. The decision amounted mostly to an important political gesture by Mussolini, with low economic costs.

As discussed in section 2, the literature maintains that an important consequence of the revaluation was wage compression, which helped to reduce the adverse effects of "quota 90" on the competitiveness of the firms and, therefore, reducing the worsening of the current account. To test the role of the wage policy, we perform a Granger-causality analysis (Granger, 1969) to check whether one variable precedes the change in the other[22]. Preliminaryly, we need to analyze the stochastic properties of the wage variable. Since the data from Zamagni (1975), which ran from 1911 through 1939, are real values with base 1938, to make it comparable in the econometric analysis with the series of the terms of trade, we have rebased it for 1911.

that year Italian trade returned to its pre-crisis level (see the Baffigi data on national accounting www.bancaditalia.it/pubblicazioni/quaderni-storia/2011-0018/). Since our analysis is concerned with Italian foreign trade, we think this is an appropriate way to capture the effects of the Great Depression. We thank one reviewer for this point.

[21] The "biennio rosso" is the period between 1919 and 1920, characterized by a series of workers' and peasants' struggles that reached their peak and conclusion with the occupation of factories in September 1920. These actions were located especially in central-northern Italy. In some instances, workers took control of the factories (Spriano, 1964). The economy was suffering from the effects of WWI, Candeloro (1996, p. 229) reports that between 1913 and 1918 there was a 35.4% decrease in real wages. These events created the fear of a Soviet-like revolution, the decline of the traditional liberal forces ruling the country that, coupled with the veterans of WWI that claimed a political role, led to the growth of Fasci di combattimento and the subsequent fascist coup in October 1922 (Salvadori, 2018).

[22] As Leamer (1985) argued, Granger causality is better described as "precedence" since rather than testing whether X causes Y, the Granger causality tests whether X forecasts Y.

We take the log of this variable and find that the ADF test cannot reject the null hypothesis of a unit root, whereas the KPSS test rejects the null of stationarity at the 10% level (Table 5, panel A). Taking these tests together, we conclude that the series is likely I(1). Replicating both tests in first-differences yields stationarity. To test for Granger causality, we take the first-differences of both lnWage and lnToT and estimate a VECM as before. Panel B in Table 5 reports the results of the tests for Granger-causality. While we cannot reject the null hypothesis that wage does not Granger-cause ToT, we can reject the null that ToT does not Granger-cause wage. Therefore, changes in ToT anticipate variations in wages, as the economy adjusts to changes in prices.

Table 5.
Granger causality

Panel A - Unit root tests				
	ADF		KPSS	
	Level	First-differences	Level	First-differences
lnWage	-2.403	-4.314	0.381	0.131
Panel B – Cointegration				
H_0: wage does not Granger-cause ToT				
Test statistic l = 3.557 pval-F(7, 4) = 0.1187				
H_0: ToT does not Granger-cause wage				
Test statistic l = 116.939 pval-F(7, 4) = 0.0002				

Critical values for the ADF test: -3.43 (1%), -2.86 (5%), and -2.57 (10%). Critical values for the KPSS test: 0.347 (10%), 0.463 (5%), and 0.739 (1%). For wage, the number of lags in level and first-differences in both the ADF test and the KPSS test is 2. The number of lags was selected through the Akaike Information Criterion.

Having established the role of the wage compression policy, we can introduce a dummy variable equal to 0 before 1926 and equal to 1 afterwards to have a further robustness check for our model. In this case, the VECM with factorization becomes:

$$\prod = (-0.233 \; -0.271)^{*} \begin{pmatrix} 1 \\ 0.988 \end{pmatrix}' \qquad (6)$$

Which is consistent with the previous results.

We can interpret these results jointly. The mild effect on output is likely to be related to the policy of wage compression that reduced the costs for firms and allowed them to keep their competitiveness, despite the nominal shock.

5. Conclusions

This paper provides a time series characterisation of the relationship between the terms of trade and GDP for the Italian economy from 1911 to 1939. It identifies the average effect, which is used to interpret the economic consequences of the revaluation of the lira announced in 1926 and implemented in 1927. We find that the two variables have a common long-run relationship and that short-term adjustment was relatively fast. In this sense, the output effect was relatively limited, and some adjustments in the economy took place.

This adjustment took place in the labor market. In the terms of trade, the export prices depend both on the nominal exchange rate (the variable shocked by government policy) and domestic prices (also affected by government policy but in the opposite direction by reducing workers' rights and wages). The surrogate role of the fascist labour policy to reduce the negative effects of revaluation is highlighted in the Granger-causality analysis, which shows that changes in the terms of trade anticipate changes in wages. More specifically, a deterioration of the terms of trade caused by the revaluation was followed by a reduction in wages and therefore in prices. The policy amounted to internal devaluation aimed at reducing domestic costs, allowing firms to accommodate the higher costs due to "quota 90".

This is not surprising: had the terms of trade remained unadjusted, a balance of payment crisis would have emerged, with the likely relinquishment of the newly regained membership to the Gold Exchange Standard. Political considerations outweighed economic concerns. "Quota 90" was the way that the fascist government sought to gain some international standing in the wake of the return to the Gold Standard system, which took place at that time.

"Quota 90" was an important step in the economic policy of fascism, together with autarchy and the banking reform. Given the sample size and the available variables, some caution should be taken in interpreting the results, which we should take as the first evidence that challenges some of the received wisdom of the qualitative literature. Further work should first try to work out better data that may lead to more solid results. Furthermore, along the lines of counterfactual history, other research may assess whether a smaller revaluation – as discussed in the existing literature - would have been more beneficial for the Italian economy.

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References

Astore, M. and Fratianni, M. (2019). "'We Can't Pay': How Italy Dealt with War Debts after World War I", *Financial History Review*, 26, 197-222.

Bachi, R. (1937). "Il mercato finanziario italiano 1919-1936", *Annali di Economia*, 12, 203-229.

Baffi, P. (1973). "La rivalutazione del 1926-27, gli interventi sul mercato e l'opinione pubblica". In: Baffi, P., *Nuovi studi sulla moneta*, Milano: Giuffrè.

Baffigi, A. (2013). "National Accounts, 1861-2011", in Toniolo, G. (ed.), *The Oxford Handbook of the Italian Economy Since Unification* (pp. 157-186). New York: Oxford University Press.

Bonelli, F., Cafagna, L. and Galli della Loggia, E. (1976). "L'economia italiana nel periodo fascista: alcune osservazioni", *Quaderni Storici*, 31, 359-373.

Bordo, M. and Rockoff, H. (1996). "The Gold Standard as a 'Good Housekeeping Seal of Approval'", *The Journal of Economic History*, 56 (2), 389-428.

Bordo, M. and MacDonald, R. (2003). "The Inter-War Gold Exchange Standard: Credibility and Monetary Independence", *Journal of International Money and Finance*, 22, 1-32.

Borgatta, G. (1937). "La politica monetaria nel sistema corporativo", *Annali di Economia*, 12, 231-311.

Cafaro P. (2001). *La solidarietà efficiente. Storia e prospettive del credito cooperativo in Italia, (1883-2000)*. Roma-Bari: Laterza.
Capie, F. and Webber, A. (1985). *A Monetary History of the United Kingdom*. London: Allen and Unwin.
Cardarelli, S., Cotula, F. and Spaventa, L. (1993). *La politica monetaria tra le due guerre, 1919-1935*. Roma: Laterza.
Cavalcanti, M. L. (2011). *La politica monetaria italiana fra le due guerre (1918-1943)*. Milano: FrancoAngeli.
Ciocca, P. L. and Toniolo, G. (1976). *L'economia italiana nel periodo fascista*. Bologna: Il Mulino.
Cohen, J. (1972). "The 1927 Revaluation of the Lira: a Study in Political Economy", *The Economic History Review*, 25, 642-654.
Cohen, J. (1988). "Was Fascism a Developmental Dictatorship? Some Evidence to the Contrary", *Economic History Review*, 41, 95-113.
Cotula, F. and Spaventa, L. (2003). "La Politica Monetaria Fra Le Due Guerre. 1919–-1935", in F. Cotula, M. De Cecco, and G. Toniolo (eds.), *La Banca d'Italia. Sintesi Della Ricerca Storica* 1893-1960. Laterza, pp. 209-310.
De Cecco, M. (2000). *L'economia di Lucignolo. Opportunità e vincoli dello sviluppo italiano*. Roma: Donzelli.
De Cecco, M. (1993). *L'Italia e il sistema finanziario internazionale*, 1919-1936. Bari: Laterza.
De Cecco, M., Roccas, M. and Sannucci, V. (1990). *L'Italia e il sistema finanziario internazionale: 1861-1914*., Roma; Bari: Laterza.
De Felice, R. (1966). "I lineamenti politici della 'quota 90' attraverso i documenti di Mussolini e di Volpi", *Il Nuovo Osservatore*, 7, 370-395.
De Felice, R. (1968). *L'organizzazione dello stato fascista: 1925-1929*. Torino: Einaudi.
De' Stefani, A. (1998). *Quota 90: la rivalutazione della lira 1926-1928*. Torino; Roma: UTET Libreria Bancaria.
Del Vecchio, G. (1932). *Cronache della lira in pace e in guerra*. Milano: Treves.
Di Martino, P. (2021). "Still Glittering: A Review of the Literature on the Classical Gold Standard, 1996-2020", *Rivista di Storia Economica*, 37, 297-318.
Di Nino, V., Eichengreen, B. and Sbracia, M. (2013). "Real Exchange Rates, Trade, and Growth", in G. Toniolo (ed.), *The Oxford Handbook of the Italian Economy Since Unification*. Oxford: Oxford University Press.
Dickey, D. A. and Fuller, W. A. (1979). "Distribution of the Estimators for Autoregressive Time Series with a Unit Root", *Journal of the American Statistical Association*, 74, 427-431.
Engle, R. F. and C. W. J. Granger (1987). "Cointegration and Error Correction: Representations, Estimation and Testing", *Econometrica*, 55, 251-276.
Falco, G. C. and Storaci, M. (1977). "Il ritorno all'oro in Belgio, Francia e Italia: stabilizzazione sociale e politiche monetarie (1926-1928)", *Italia Contemporanea*, 29, 3-44.
Federico, G., Natoli, S., Tattara, G. and Vasta, M. (2011). *Il Commercio Estero Italiano 1882-1950*, Bari-Roma: Laterza.
Fisher, I. (1933) "The Debt-Deflation Theory of Great Depressions", *Econometrica*, 1, 337-357.
Flandreau, M. and F. Zumer (2004). *The Making of Global Finance 1880-1913*. Paris: OECD.
Fratianni, M. and Spinelli, F. (1997). *A Monetary History of Italy*. Cambridge: Cambridge University Press.
Gabbuti, G. (2020). "'When We Were Worse Off'. The Economy, Living Standards and Inequality in Fascist Italy", *Rivista di Storia Economica*, 36, 253-298.
Giordano, C. and Giugliano, F. (2015). "A Tale of Two Fascisms: Labour Productivity Growth and Competition Policy in Italy, 1911-1951", *Explorations in Economic History*, 55, 25-38.
Granger, C. W. J. (1969). "Investigating Causal Relations by Econometric Models and Cross-spectral Methods", *Econometrica*, 37, 424-438.
Gregor, J. (1979). *Italian Fascism and Developmental Dictatorship*. Princeton University Press.
Grifone, P. (1971). *Il capitale finanziario in Italia*, Torino: Einaudi.
Gualerni, G. (1994). *Storia dell'Italia industriale. Dall'Unità alla Seconda Repubblica*. Milano: Etas.
Johansen, S. (1988). "Statistical Analysis of Cointegration Vectors", *Journal of Economic Dynamics and Control*, 12, 231-254.
Kwiatkowski, D., Phillips, P. C. B., Schmidt, P. and Shin, Y. (1992). "Testing the Null Hypothesis of Stationarity against the Alternative of a Unit Root", *Journal of Econometrics*, 54, 159-178.
La Francesca, S. (1972). *La politica economica del fascismo*. Bari: Laterza.
Leamer, E. E. (1985). "Vector Autoregressions for Causal Inference?", *Carnegie-Rochester Conference Series on Public Policy*, 22, 255-304.
Lütkepohl, H. and Krätzig, M. (2004). *Applied Time Series Econometrics*. Cambridge: Cambridge University Press.
Marconi, M. (1982). *La politica monetaria del fascismo*. Bologna: Il Mulino.
Marinkov, M. (2019). "Conquering the Debt Mountain: Financial Repression and Italian Debt in the Interwar Period", in Dabla-Norris, E. (ed.), *Debt and Entanglements Between the Wars*. Washington: International Monetary Fund, pp. 173-204.
Melograni, P. (1980). *Gli industriali e Mussolini. Rapporti tra Confindustria e fascismo dal 1919 al 1929*. Milano: Longanesi.
Migone, G. G. (1973). "La stabilizzazione della lira: la finanza americana e Mussolini", *Rivista di Storia Contemporanea*, 2, 145-148.
Molteni, M. 2021. *The Distress of Italian Commercial Banks in 1926-1936: a New Dataset from Banking Supervision Archives*. Oxford Economic and Social History Working Papers, number 194. University of Oxford.
Molteni M. and Pellegrino D. (2022). "The establishment of banking supervision in Italy: an assessment (1926-1936)", *Business History*. Available at: 10.1080/00076791.2022.2134347
Nickelsburg, G. (1985). "Small-sample Properties of Dimensionality Statistics for Fitting VAR Models to Aggregate Economic Data: A Monte Carlo Study", *Journal of Econometrics*, 28, 183-192.
Onida, F., Berta, G., Perugini, M. (2013). "Old and New Italian Manufacturing Multinational Firms", in G. Toniolo (ed.), *The Oxford Handbook of the Italian Economy Since Unification*. Oxford: Oxford University Press.
Ricciuti, R. (2014). "Fascism Was Not a Developmental Dictatorship. Evidence from Simple Tests", *Historical Social Research*, 39, 337-346.
Sabbatucci Severini, P. and Trento, A. (1975). "Alcuni cenni sul mercato del lavoro durante il fascismo", *Quaderni Storici*, 29-30, 550-578.
Saint Marc, M. (1983). *Histoire monetaire de la France*, 1800-1980. Paris: Presses Universitaires de la France.
Salvadori, M. L. (2018). *Storia d'Italia. Il cammino tormentato di una nazione 1861-2016*, Torino: Einaudi.
Sarti, R. (1970). "Mussolini and the Italian Industrial Leadership in the Battle of the Lira 1925-1927", *Past and Present*, 47, 97-112.
Segreto, L. (2019). "Giuseppe Volpi di Misurata al Ministero delle finanze: tecnocrate o politico?", in Barucci, P., Bini, P. and Conigliello, L. (eds.), *Intellettuali e uomini di regime nell'Italia fascista*. Firenze: Firenze University Press.
Sommariva, A. and Tullio, G. (1987). *German Macroeconomic History*, 1880-1979. New York: St. Martin's.
Spriano, P. (1964). *L'occupazione delle fabbriche. Settembre 1920*. Torino: Einaudi.
Sraffa, P. and Tasca, A. (1927). "Politica monetaria", *Lo Stato Operaio*, novembre-dicembre.
Storaci, M. and Tattara, G. (2001). "Kingdom of Italy's External Borrowing and Domestic Monetary Policy between the Two World Wars", *Financial History Review*, 8, 49-72.
Sylos Labini, P. (1965). "La politica economica del fascismo. La crisi del '29", *l'Astrolabio*, 3, 32-34.
Tattara, G. and Toniolo, G. (1975). "Lo sviluppo industriale italiano tra le due guerre", *Quaderni Storici*, 10, 377-437.
Tattara, G. and Toniolo, G. (1976). "L'industria manifatturiera: cicli, politiche e mutamenti di struttura", in Ciocca, P.L. and Toniolo, G. (eds.), *L'economia italiana nel periodo fascista*. Bologna: Il Mulino.
Toniolo, G. (1980). *L'economia dell'Italia fascista*. Bari: Laterza.
Toniolo, G. (1993). "Il profilo economico", in G. Guarino e G. Toniolo (eds.), *La Banca d'Italia e il sistema bancario* 1919-1936. Roma; Bari: Laterza, pp. 5-101.
Toniolo, G. (1995). "Italian Banking 1918-1939", in Feinstein, C. (ed.), Banking, Currency, and Finance in Europe Between the Wars. Oxford: Clarendon Press.
Toniolo, G. and Salsano, F. (2011). *Da Quota 90 allo Sme*. Roma; Bari: Laterza Editori.
Zamagni, V. (1976). "La dinamica dei salari nel settore industriale, 1921-1939", *Studi Storici*, 10, 530-549.